

WHAT IS CLAIMED IS:

1 1. An exhaust manifold cooling jacket comprising a housing to be attached to a
2 cylinder head of a combustion engine, the housing defining
3 a cavity sized to enclose an exhaust manifold of the engine and form an insulating
4 space between the exhaust manifold and housing, as attached to the cylinder head,
5 a coolant passage therein for receiving liquid coolant from an inlet of the jacket and
6 for flowing the coolant through the cooling jacket, and
7 an exhaust passage extending between an inner manifold interface surface of the
8 housing and an exhaust elbow interface surface of the housing, for forming a sealed exhaust
9 conduit for conducting a flow of exhaust from the exhaust manifold through the housing.

1 2. The exhaust manifold cooling jacket of claim 1, wherein the cooling jacket
2 housing is in the form of a shell having an open side sufficiently large to permit the housing
3 to be placed about the exhaust manifold of the engine with the exhaust manifold mounted
4 upon the cylinder head.

1 3. The exhaust manifold cooling jacket of claim 2, wherein the open side of the
2 housing comprises a rim extending about the open side and lying in a single plane to form a
3 planar block interface surface.

1 4. The exhaust manifold cooling jacket of claim 3, wherein the rim of the
2 housing is arranged to be coplanar with a block interface surface of the exhaust manifold, as
3 attached to the cylinder head, for engaging a backing plate mounted between the cylinder
4 head and exhaust manifold and extending laterally beyond the exhaust manifold.

1 5. The exhaust manifold cooling jacket of claim 1, wherein the cooling jacket
2 housing is sized and constructed to directly contact the exhaust manifold only at the inner
3 manifold interface surface.

1 6. The exhaust manifold cooling jacket of claim 1, wherein the coolant passage
2 comprises a single enclosed, cup-shaped cavity extending across one broad face of the
3 housing and into multiple sides of the housing.

1 7. The exhaust manifold cooling jacket of claim 1, wherein the housing further
2 defines a coolant outlet extending from the coolant passage through the exhaust elbow
3 interface surface adjacent the exhaust conduit.

1 8. The exhaust manifold cooling jacket of claim 1, wherein the housing is in the
2 form of a unitary casting.

1 9. The exhaust manifold cooling jacket of claim 1, wherein the housing further
2 defines at least one mounting hole extending through the housing adjacent the exhaust
3 passage and arranged to align with a mounting hole on the exhaust manifold, for receiving a
4 threaded fastener to attach the housing to the cylinder head via the exhaust manifold.

1 10. The exhaust manifold cooling jacket of claim 9, wherein the mounting hole of
2 the housing is further arranged to align with a corresponding mounting hole on an exhaust
3 elbow placed against the exhaust elbow interface surface to receive exhaust flow from the
4 exhaust conduit, for simultaneously attaching both the housing and the exhaust elbow to the
5 exhaust manifold.

1 11. The exhaust manifold cooling jacket of claim 1, wherein the cooling jacket is
2 constructed to isolate the liquid coolant from any direct contact with the exhaust manifold.

1 12. The exhaust manifold cooling jacket of claim 1, wherein said insulating space
2 is filled with air and isolated from the flow of exhaust.

1 13. The exhaust manifold cooling jacket of claim 1, wherein said insulating space
2 is filled with a conductively insulating material.

1 14. A method of altering a combustion engine to enhance exhaust gas cooling for
2 use in a marine environment, the method comprising the step of placing a cooling jacket
3 directly between an upstream exhaust manifold secured to a cylinder head of the engine, and
4 a downstream exhaust elbow of the engine, the cooling jacket comprising a housing defining
5 a cavity sized to enclose an exhaust manifold of the engine and form an insulating
6 space between the exhaust manifold and housing, as attached to the cylinder head,

7 a coolant passage therein for receiving liquid coolant from an inlet of the jacket and
8 for flowing the coolant through the cooling jacket, and
9 an exhaust passage extending between an inner manifold interface surface of the
10 housing and an exhaust elbow interface surface of the housing, for forming a sealed exhaust
11 conduit from the exhaust manifold through the housing.

1 15. The method of claim 14 further comprising the step of placing a backing plate
2 between the exhaust manifold and the cylinder head, the backing plate defining sealed
3 passages therethrough for conducting exhaust gasses from the cylinder head to the exhaust
4 manifold, the backing plate extending laterally beyond the exhaust manifold to engage the
5 cooling jacket housing to inhibit air flow through the insulating space between the cooling
6 jacket housing and the exhaust manifold.

1 16. The method of claim 14 further comprising the step of providing the exhaust
2 elbow with a coolant passage with an inlet for receiving the coolant from the cooling jacket
3 housing and for injecting the coolant into a flow of exhaust received from the exhaust
4 manifold through the cooling jacket housing.

1 17. The method of claim 14 comprising simultaneously mounting the exhaust
2 elbow and cooling jacket housing to the exhaust manifold by inserting at least one fastener
3 through aligned mounting holes in the exhaust elbow and cooling jacket housing and securing
4 the fastener to the exhaust manifold.

1 18. An exhaust manifold cooling jacket, comprising
2 a housing forming a cavity sized to enclose an exhaust manifold of a combustion
3 engine with a gap therebetween, the housing defining a coolant inlet and a passage
4 therethrough for the flowing of liquid coolant through the cooling jacket.